# STRATEGIES FOR INNOVATION

## THE B.C. SCIENCE AND TECHNOLOGY POLICY

Ministry of Advanced Education and Job Training
and Ministry Responsible for Science and Technology
Hon. Stanley B. Hagen, Minister

89-00356/

# PREFACE

In May, 1987, fourteen business and academic leaders were appointed to the Premiers Advisory Council for Science and Technology. One of the council's tasks was to develop science and technology policies for British Columbia to guide public and private sectors over the next 10 to 20 years. The council recommended a policy which has ben adopted by the Government. This policy provides the framework for a prosperous future for B.C., where science and technology play a vital role.

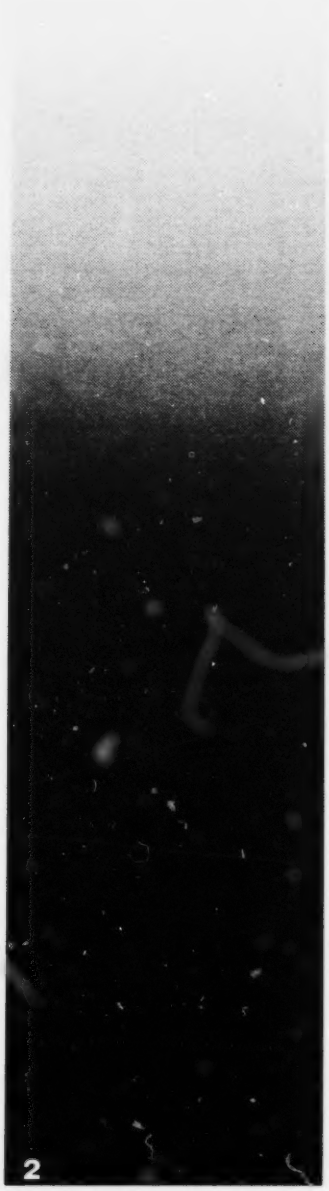
## Premier's Advisory Council on Science and Technology members:

Mr. Robert F. Alexander (Chairman)
Dr. John Borden
Dr. Bonnie Bukwa
Mr. Klaus Deering
Mr. Helmut Eppich
Mr. Patrick Fisher
Mr. Harry Gairns
Dr. John Hayward
Dr. John MacDonald
Dr. Jim McEwen
Mr. Roy Murray
Dr. David Strangway
Mr. Michael Warren, Q.C.
Mr. Jack Wilson

**Hon., William N. VanderZalm**
**Premier of British Columbia**

**Hon Stanley B. Hagen,**
**Minister Responsible**
**for Science and Technology**

# VISION



Any program must be built on a vision of the future. Thus, we begin with our vision of British Columbia 20 years from today.

We see British Columbia as having-

- a strong, global-based economy that provides its people with one of the highest standards of living in the world
- extraordinary renewable resources (forest, fish, water, wildlife) that it cultures with care and profit
- a small population of well-educated, healthy people, productively employed
- a clean environment
- a special relationship with Pacific Rim countries that fosters exchange and trade
- a reputation for being a receptive host to visitors who wish to share in its beauty, its adventure, and its industry.

We believe science and technology can make a major contribution to these goals.

The emphasis in this vision is on a high quality of life, enabled by modest growth in population, educational and employment opportunities, excellent health care, a clean environment, and prudent management of our natural resources. We see British Columbia as being a centre where innovation is the norm, not the exception.

# BACKGROUND

To realize this vision, policies must be in place that will help us respond to world trends, to overcome weaknesses, and to take advantage of opportunities. Many of these policies are already in place. But, to date we have lacked explicit policies in an area of growing importance: science and technology. Without explicit policies, we are in danger of adopting implicit policies that do not contribute to realizing our vision.

We review below some trends and facts that make it particularly important for British Columbia to adopt explicit science and technology policies.

1. Work in the field of economics over the past 30 years has shown that long-term, sustained economic growth depends to a much greater extent on technological progress than on increases in capital and labour. At present, we are falling behind the leading nations and the rest of Canada in research, development and commercialization of new products and processes. To ensure our continued economic prosperity and our competitiveness in world markets, we must develop policies that will correct this situation.
2. British Columbia has historically relied on resource industries for driving its economic machine, but we are facing increasing competition in this sector. To help meet this challenge, policies are needed that will encourage the continued development and application of new products and services resulting in more value-added output from the resource sector.
3. To moderate the boom and bust cycles inherent in a resource-based economy, British Columbia needs to diversify its economy. Technology-intensive industries, such as microelectronics and biotechnology, could make a significant contribution to this diversification if policies are in place that provide appropriate support.
4. Knowledge-intensive industries are growing in number and importance, and information is increasingly becoming a product in its own right. Policies need to be in place to guide and nurture these areas so that we realize the maximum benefit from their development. Policies must also be in place to ensure that British Columbia has people with the required scientific and technological training to provide the necessary manpower as these new industries emerge.
5. The world is increasingly becoming a global economy. This means that competitive niches must be carved out with care and that efforts must be devoted to creating viable international markets for our products.

# POLICIES

To be effective, policies must contribute to our vision, must be rooted in the current domestic and world situation, must be resilient and durable in the face of continuing shifts in the external environment, and must be socially and politically viable. With these criteria in mind, we have developed the following science and technology policies.

1. **Support the use and development of technological innovations that -**
   **a) build on existing strengths and capabilities**
   **b) have export potential**

We will derive the most benefit from scientific and technological developments when they are applied to areas in which we have existing strengths. Our natural resource sector, which accounts for the largest share of our current Gross Domestic Product and the majority of our provincial export, is one such area.

We have further opportunities to increase our competitive position in world markets by improving our productivity and by developing innovative products and services. In may cases, we can capitalize on distribution channels and international relationships that already exist.

We also excel in communication technologies. Similar opportunities exist in this areas to develop products and services that enhance our own communication infrastructure and have export potential.

Our service sector, which has been a major source of employment growth, is very strong. Some members of this sector have already adopted technological innovations that increase productivity and lead to new services. Others have been slow to change. To ensure this sector's continued economic health and growth, technology must be diffused even further.

Many of our public sector services such as health care and education are highly advanced and contain many opportunities for commercialization through the further application of science and technology. This would benefit British Columbians immediately and could result in valuable export products.

2. **Encourage the use of science and technology to optimize the quality of life for British Columbians through protecting and improving our natural, manmade, and cultural environments, and do so in a way that produces products and services that can be exported.**

A prevailing problem in industrialized countries is the deterioration of the environment. In many areas, the natural environment is suffering from the effects of pollutants; and manmade environments (for example, building interiors) are suspected of causing various ailments in those who inhabit them. A tremendous opportunity, therefore, exists to produce products and services that address these problems.

Such products and services would contribute to the quality of life in British Columbia and would have great export potential as the world grapples with critical pollution problems.

3. **Recognize the importance of basic research, and encourage applied research of an international calibre in areas that contribute significantly to British Columbia's economic development and competitiveness.**

Research is the engine that drives scientific and technological developments. A strong basic research effort will enable British Columbia to generate a unique applied research capacity, to capitalize on the research efforts of others, and to contribute to the world pool of knowledge.

4. **Foster entrepreneurial enterprises and encourage partnerships among post secondary institutions, government, industry and labour that will promote technology transfer and encourage commercialization of the results of basic and applied research.**

Technological and scientific information is available that could increase production, improve products, and reduce environmental impacts of existing industries. Some effective mechanisms are in place for transferring technology and scientific information to industries that can use them. Linkages between universities and industry have led to an increasing number of new enterprises such as Phero Tech, Moli Energy and Quadra Logic. But much more could be done to encourage linkages and even partnerships between post-secondary educational institutions and industry.

At the moment, we are good at creating innovative technologies, but we do not commercialize well. In fact, many of our innovations have been commercialized in other countries. For example, although applied research for aquaculture was conducted in Nanaimo, the aquaculture industry was first commercialized in Norway. Thus, we are not getting the maximum benefit from our research efforts.

At present, Discovery Enterprises Inc. and the Science Council facilitate commercialization through equity financing and grants. But we need more mechanisms like this on a much larger scale.

5. **Support the development of marketing programs that take advantage of British Columbia's unique geographical location and cultural makeup.**

British Columbia is fortunate in having ready access to a large U.S. market and to a growing market on the Pacific Rim. It is also fortunate in having a diverse cultural mix, with a large population of people who originated in, and thus have ties to, countries on the Pacific Rim. But to date, few markets have been established for the products and services developed by British Columbia's technology-intensive industries. To correct this situation, a concerted effort needs to be made to develop marketing programs that will exploit our advantages.

6. **Strengthen the science and technology components at all levels of the educational system so that scientific and technological literacy is improved, more people are attracted to careers in science and technology, and our universities continue to produce graduates and research of the highest possible calibre.**

Increasing the scientific literacy of the general population will make people feel less threatened by technological advances and more open to innovation. Moreover, an adequate science and technological education in the early school years would give our youth the vision and ability to excel. Our universities need to produce more world-class talent to ensure we can take a leadership position in specific technology-intensive areas.

7. **Encourage government, institutions, industry and labour to communicate the benefits of science and technology to the general public so that the public supports science and technology policies and initiatives.**

The negative effects of technological innovations (such as pollutions and loss of employment) tend to receive more attention than their positive effects (such as excellent health care, abundant leisure time, and reduction of mind-numbing repetitive labour), which are often taken for granted.

Thus, the general public often resists changes brought about by technology. Unless the public feels more comfortable with technological innovations, and supports science and technology policies, it will be difficult, if not impossible, to institute some of the programs needed in this province.

8. **Make educational programs available in science and technology to enable retraining, upgrading , and acquisition of new knowledge, to ensure an educated and adaptable work force in the trades professions.**

Industry, government, labour and the public have trouble adjusting to changes brought about by technological and scientific innovation. To make the necessary adjustments, people need to have the opportunity to continue educating themselves and to see this as a viable and natural course of action.

9. **Provide a level of direct government financial support for technology-intensive industries that will enable British Columbia to be competitive nationally and internationally.**

Governments around the world and in Canada are providing various kinds of support for technology-intensive industries. If British Columbia's industries are to compete with these industries in world markets, government here, too, must provide a comparable level of support.

# SUMMARY OF POLICY

Support the use and development of technological innovations that–

- build on existing strengths and capabilities
- have export potential

Encourage the use of science and technology to optimize the quality of life for British Columbians through protecting and improving our natural, manmade, and cultural environments, and do so in a way that produces products and services that can be exported.

Recognize the importance of basic research, and encourage applied research of an international calibre in areas that contribute significantly to British Columbia's economic development and competitiveness.

Foster entrepreneurial enterprises and encourage partnerships among post-secondary institutions, government, industry, and labour that will promote technology transfer and encourage commercialization of the results of basic and applied research.

Support the development of marketing programs that take advantage of British Columbia's unique geographical locations and cultural makeup.

Strengthen the science and technology components at all levels of the educational system so that scientific and technological literacy is improved, more people are attracted to careers in science and technology, and our universities continue to produce graduates and research of the highest possible calibre.

Encourage government, institutions, industry and labour to communicate the benefits of science and technology to the general public so that the public supports science and technology policies and initiatives.

Make educational programs available in science and technology to enable retraining, upgrading and acquisition of new knowledge, to ensure an educated and adaptable work force in the trades and professions.

Provide a level of direct government financial support for technology-intensive industries that will enable British Columbia to be competitive nationally and internationally.